

WHAT IS CLAIMED IS:

1. A composition comprising pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \text{ } \mu\text{m})}{(\text{cumulative mass at } 2 \text{ } \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

2. The composition according to Claim 1, wherein the pulverized hydrous kaolin has a median particle size (D_{50}) ranging from about 0.5 μm to about 1.5 μm .

3. The composition according to Claim 1, wherein the pulverized hydrous kaolin has a median particle size (D_{50}) of less than about 2.0 μm and greater than about 0.4 μm .

4. The composition according to Claim 2, wherein the pulverized hydrous kaolin has a median particle size (D_{50}) of less than about 1.0 μm and greater than about 0.5 μm .

5. A composition comprising hydrous kaolin, wherein the hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \text{ } \mu\text{m})}{(\text{cumulative mass at } 2 \text{ } \mu\text{m})} \leq 0.5 ,$$

a median particle size (D_{50}) less than or equal to about 2.0 μm , and a Hegman grind of more than about 2 in 3 minutes using "SSM" V-T Alkyd Hegman Test.

6. The composition according to Claim 5, wherein the hydrous kaolin has a Hegman grind of more than about 2.5 in 3 minutes using the "SSM" V-T Alkyd Hegman Test.

7. The composition according to Claim 6, wherein the hydrous kaolin has a Hegman grind of more than about 3 in 3 minutes using the "SSM" V-T Alkyd Hegman Test.

8. The composition according to Claim 5, wherein the hydrous kaolin has a median particle size (D_{50}) ranging from about 0.5 μm to about 1.5 μm .

9. The composition according to Claim 5, wherein the hydrous kaolin has a median particle size (D_{50}) of less than about 2.0 μm and greater than about 0.4 μm .

10. The composition according to Claim 8, wherein the hydrous kaolin has a median particle size (D_{50}) of less than about 1.0 μm and greater than about 0.5 μm .

11. A method of preparing a kaolin composition comprising:
pulverizing hydrous kaolin wherein the hydrous kaolins have the following particle size distribution ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5, \text{ and}$$

a median particle size (D_{50}) less than or equal to about 2.0 μm ; and
including the pulverized hydrous kaolins in the composition.

12. A method for increasing the dispersion rate of hydrous kaolins, comprising pulverizing the hydrous kaolins wherein the hydrous kaolins have a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5, \text{ and}$$

a median particle size (D_{50}) less than or equal to about 2.0 μm .

13. An ink comprising, in an appropriate medium, hydrous kaolin, wherein the hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5,$$

a median particle size (D_{50}) less than or equal to about 2.0 μm , and a Hegman grind of more than about 2 in 3 minutes using "SSM" V-T Alkyd Hegman Test.

14. The ink according to Claim 13, wherein the appropriate medium is chosen from aqueous media and non-aqueous media.

15. The ink according to Claim 13, wherein the ink is chosen from gravure inks, heat-set inks, lithographic printing inks, and newsprint inks.

16. The ink according to Claim 13, further comprising at least one component chosen from resins, polymers, additives, fillers, diluents, humectants, lecithin, and biocides.

17. The ink according to Claim 16, wherein the resins are chosen from vinyl resins, acrylic resins, hydrocarbon resins, polyester resins, metal-containing resins, and cellulosic resins.

18. The ink according to Claim 16, wherein the additives are chosen from rheology modifiers, surfactants, and drying accelerating agents.

20. The ink according to Claim 19, wherein the drying accelerating agents are chosen from sodium lauryl sulfate, N,N-diethyl-m-toluamide, cyclohexylpyrrolidinone and butyl carbitol.

21. The ink according to Claim 17, wherein the humectants are chosen from ethylene glycol, propylene glycol, diethylene glycols, glycerine, dipropylene glycols, polyethylene glycols, polypropylene glycols, amides, ethers, carboxylic acids, esters, alcohols, organosulfides, organosulfoxides, sulfones, alcohol derivatives, carbitol, butyl carbitol, cellosolve, ether derivatives, amino alcohols, and ketones.

22. The ink according to Claim 17, wherein the biocides are chosen from benzoates, sorbates, and isothiazolones.

23. The ink according to Claim 13, further comprising at least one pigment.

24. A paint comprising, in an appropriate medium, hydrous kaolin, wherein the hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

a median particle size (D_{50}) less than or equal to about 2.0 μm , and a Hegman grind of more than about 2 in 3 minutes using "SSM" V-T Alkyd Hegman Test.

25. The paint according to Claim 24, wherein the paint is chosen from architectural paints, deco paints, art paints, and industrial coatings.

26. The paint according to Claim 24, wherein the paint has a pigment volume concentration in the range of 1%-80%.

27. The paint composition of Claim 24, wherein the paint has a pigment volume concentration below its critical pigment volume concentration.

28. The paint according to Claim 24, further comprising at least one component chosen from binders and additives.

29. The paint according to Claim 28, wherein the binders are chosen from aqueous dispersible binders and non-aqueous dispersible binders.

30. The paint according to Claim 28, wherein the binders are chosen from polyvinyl alcohol, acrylic, vinyl acrylic, vinyl acetate, styrene-containing and latex-containing binders.

31. The paint according to Claim 28, wherein the additives are chosen from surfactants, thickeners, defoamers, wetting agents, dispersants, biocides, and coalescents.

32. The paint according to Claim 28, further comprising at least one pigment.

33. The paint according to Claim 32, wherein the at least one additional pigment is chosen from TiO_2 and calcium carbonate.

34. A polymer product comprising hydrous kaolin, wherein the hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

a median particle size (D_{50}) less than or equal to about $2.0 \mu\text{m}$, and a Hegman grind of more than about 2 in 3 minutes using "SSM" V-T Alkyd Hegman Test.

35. The polymer product according to Claim 34, further comprising at least one polymer resin.

36. The polymer product according to Claim 35, wherein the at least one polymer resin is chosen from polyolefin resins, allyl resins, polyamide resins, polyester resins, engineering polymers, thermoplastic resins and thermoset resins.

37. A rubber product comprising hydrous kaolin, wherein the hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

a median particle size (D_{50}) less than or equal to about 2.0 μm , and a Hegman grind of more than about 2 in 3 minutes using "SSM" V-T Alkyd Hegman Test.

38. The rubber product according to Claim 37, wherein the rubber product comprises at least one rubber chosen from natural rubbers and synthetic rubbers.

39. The rubber product according to Claim 38, wherein the synthetic rubbers are chosen from sulphur-vulcanisable rubbers, styrene-butadiene rubbers, vinyl-styrene-butadiene rubbers, butadiene rubbers, and neoprene rubbers.

40. The rubber product according to Claim 39, wherein the styrene-butadiene rubbers are chosen from emulsion and solution styrene-butadiene rubbers.

41. The rubber product according to Claim 39, wherein the butadiene rubbers are chosen from cis-1,3-polybutadiene rubber and cis-1,4-polybutadiene rubber.

42. The rubber product according to Claim 38, wherein the natural rubbers are Standard Malaysian natural rubbers.

43. A coating comprising hydrous kaolin, wherein the hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

a median particle size (D_{50}) less than or equal to about 2.0 μm , and a Hegman grind of more than about 2 in 3 minutes using "SSM" V-T Alkyd Hegman Test.

44. The coating according to Claim 43, wherein the coating is a non-aqueous paper coating.

45. The coating according to Claim 43, wherein the coating is a paperboard coating.

46. The coating according to Claim 39, further comprising at least one binder.

47. An ink comprising, in an appropriate medium, pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

48. A paint comprising, in an appropriate medium, pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

49. A polymer product comprising pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

50. A rubber product comprising pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

51. A coating comprising pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

52. A paper coating comprising pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

53. A paperboard coating comprising pulverized hydrous kaolin, wherein the pulverized hydrous kaolin has a particle size distribution of the following ratio:

$$\frac{(\text{cumulative mass at } 0.5 \mu\text{m})}{(\text{cumulative mass at } 2 \mu\text{m})} \leq 0.5 ,$$

and a median particle size (D_{50}) less than or equal to about 2.0 μm .

54. A method for measuring the rate of dispersion of a particulate pigment or pigment mixture, said method comprising:

- a. combining the particulate pigment with an alkyd resin-containing system to form an initial pigment-containing mixture;
- b. grinding the initial pigment-containing mixture to produce a ground pigment-containing mixture;
- c. measuring the relative dispersion of the particulate pigment in the ground pigment-containing mixture;
- d. regrinding the ground pigment-containing mixture; and
- e. measuring the relative dispersion of the particulate pigment in the reground pigment-containing mixture.

55. The method of Claim 54, wherein said alkyd resin comprises a liquid, non-aqueous alkyd resin.

56. The method of Claim 54, wherein said alkyd resin comprises a vinyl-toluene resin.

57. The method of Claim 54, wherein said relative dispersions are measured using a Hegman grind gauge-based method.

58. The method of Claim 54, wherein said relative dispersions are determined by measuring the gloss and sheen of dry films prepared from the pigment-containing mixture.